AMENDMENTS TO THE CLAIMS

1   1-7.   (Canceled)

1   8.   (Currently Amended) A method of controlling use by concurrent users of a
2   distributed resource on a network, wherein use of the resource is limited to a specified
3   maximum number of concurrent users, the method comprising the computer-
4   implemented steps of:
5   providing a distributed lock manager process comprising a plurality of local lock
6   manager processes executing on a corresponding plurality of hosts,
7   wherein each of the plurality of local lock manager processes may grant a lock on the
8   same resource <u>at any time when a number of outstanding locks granted on the</u>
9   <u>same resource is less than the specified maximum number of concurrent users</u>;
10 associating a user identification for each user with one host of the plurality of hosts;
11   and
12 responding to a request for the resource associated with a first user having a first user
13   identification associated with a first host of the plurality of hosts by requesting
14   a lock from a first local lock manager process executing on the first host.

1   9.   (Original)   A method as recited in Claim 8, wherein during said step of
2   associating a user identification with one host, the first user is associated with the first
3   host based on information indicating that the first user signs onto the network most
4   frequently at a terminal node of the network that uses fewer intervening network
5   devices to pass messages to the first host than to any other host of the plurality of
6   hosts.

1   10.   (Original)   A method as recited in Claim 8, wherein during said step of
2   associating a user identification with one host, the first user is associated with the first
3   host based on information indicating that the first user signs onto the network most
4   frequently at a terminal node of the network geographically closer to the first host
5   than to any other of the plurality of hosts.

Docket No.: 50325-0511

1   11.   (Original)   A method as recited in Claim 8, wherein each local lock manager

2   process maintains a lock data structure associated with the resource and the lock data

3   structure includes a local resource maximum field; and further comprising the steps of

4   generating and storing a value in the local resource maximum field maintained by

5   each local lock manager process such that a summation over all the local lock

6   manager process of the value in the local resource maximum field does not exceed the

7   maximum number of concurrent users.

1   12.   (Original)   A method as recited in Claim 11, wherein a first value in the local

2   resource maximum field maintained by the first local lock manager process is based

3   on a number of users associated with the first host.

1   13.   (Original)   A method as recited in Claim 8, wherein a copy of the distributed

2   resource resides on a host of the plurality of hosts.

1   14.   (Original)   A method as recited in Claim 8, wherein a copy of the distributed

2   resource resides on a computing device that is not among the plurality of hosts.

1   15.   (Original)   A method as recited in Claim 11, further comprising:

2   determining whether a number of outstanding locks granted by the first local lock

3   manager process is less than a particular value stored in the local resource

4   maximum field maintained by the first local lock manager process; and

5   if the number of outstanding locks is less than the particular value, then generating

6   and returning a lock object.

1   16.   (Previously presented)   A method of controlling concurrent users of a

2   distributed resource on a network, the resource limited to a maximum number of

3   concurrent users, the method comprising the computer-implemented steps of:

4   receiving a request for the distributed resource from a client process for a user having

5   a user identification;

3

Docket No.: 50325-0511

6   determining a home location associated with the user identification, the home location

7   indicating a unique host among a plurality of hosts that execute a

8   corresponding plurality of local lock manager processes of a distributed lock

9   manager process,

10   wherein each of the plurality of local lock manager processes may grant a lock on the

11   same resource;

12   sending a request for a lock object for the distributed resource to a first local lock

13   manager process of the distributed lock manager process, the request

14   including the home location;

15   receiving the lock object for the distributed resource from a second local lock

16   manager process executing on the unique host, if a number of outstanding

17   locks granted by the second local lock manager process is less than a value of

18   a local resource maximum defined for the second local lock manager process;

19   and

20   providing access to the resource to the first client only in response to receiving the

21   lock object.

1   17.   (Original)   A method as recited in Claim 16, wherein a first host on which the first

2   local lock manager process executes is different from the unique host on which the

3   second local lock manager process executes.

1   18.   (Original)   A method as recited in Claim 16, wherein a first host on which the first

2   local lock manager process is executing is in a local network with a computing device

3   on which the client process is executing.

1   19.   (Original)   A method as recited in Claim 16, further comprising the steps of

2   determining whether a request from the client process to set the retry time period has

3   been received, and if so, automatically repeating the steps of determining, sending,

4   receiving and providing.

4

Docket No.: 50325-0511

1 20. (Previously presented) A method of controlling concurrent users of a

2 distributed resource on a network, the distributed resource limited to a maximum

3 number of concurrent users, the method comprising the steps of:

4 receiving at a first local lock manager process of a distributed lock manager process a

5 request for a lock object for the distributed resource from a resource server,

6 wherein the request includes data indicating a particular user home location;

7 determining whether a second local lock manager process of the distributed lock

8 manager process is associated with the particular user home location, and if

9 so, requesting the lock object from the second local lock manager process,

10 wherein the first local lock manager process may grant a lock on the same resource as

11 the second local lock manager process.

1 21. (Original) A method as recited in Claim 20, further comprising the steps of:

2 when the second lock manager process is not associated with the particular home

3 location, determining whether a first number of outstanding locks granted by

4 the first local lock manager process for the distributed resource is less than a

5 first local maximum number of users no greater than the maximum number of

6 concurrent users, and if so, then incrementing the first number of outstanding

7 locks granted and providing the lock object to the resource server.

1 22. (Original) A method as recited in Claim 20, wherein each local lock manager

2 process of the distributed lock manager process stores a corresponding local

3 maximum number of users for the distributed resource in a lock data structure

4 associated with the local lock manager process, and an aggregate of local maximum

5 numbers in lock data structures associated with all lock manager processes in the

6 distributed lock manager process for the distributed resource is no greater than the

7 maximum number of concurrent users to which the distributed resource is limited.

1 23. (Original) A method as recited in Claim 20, further comprising the steps of:

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2   receiving a request for a lock object from a third local lock manager process of the

3   distributed lock manager process in response to a request from a second

4   resource server;

5   determining whether a first number of outstanding locks granted by the first lock

6   manager process for the distributed resource is less than a first local maximum

7   number of users no greater than the maximum number of concurrent users;

8   and

9   if it is determined the first number of outstanding locks granted is less than the first

10   local maximum number, then

11   incrementing the first number of outstanding locks granted, and

12   providing the lock object for the second resource server.

1   24.   (Original)   A method as recited in Claim 20, further comprising the step of

2   providing the lock object to the resource server in response to receiving the lock

3   object from the second lock manager process.

1   25.   (Previously presented)   A method of distributing a resource on a network, the

2   resource limited to a maximum number of concurrent users, the method comprising

3   the steps of:

4   providing a distributed lock manager process comprising a plurality of local lock

5   manager processes executing on a corresponding plurality of hosts,

6   wherein each of the plurality of local lock manager processes may grant a lock on the

7   same resource;

8   generating a value for a local resource maximum number of users stored on each host

9   of the plurality of hosts such that a summation over the plurality of hosts of

10   the value for the local resource maximum yields an aggregate value that does

11   not exceed the maximum number of concurrent users;

12   determining whether to increase a first value in a first resource maximum stored on a

13   first host of the plurality of hosts; and

14   if it is determined to increase the first resource maximum, then

Docket No.: 50325-0511

15   decreasing by a particular amount a second value in a second resource

16   maximum stored on a second host of the plurality of hosts, and

17   increasing by the particular amount the first value in the first resource

18   maximum stored on the first host,

19   wherein each local lock manager process is configured to grant a lock for the resource

20   if the number of outstanding locks granted by the local lock manager process

21   is less than a value of the local resource maximum stored on the

22   corresponding host.

1   26.   (Original)   A method as recited in Claim 25, said step of determining whether to

2   increase the first value further comprising determining the time of day and the

3   geographic location served by the first host.

1   27.   (Original)   A method as recited in Claim 25, said step of determining whether to

2   increase the first value further comprising determining whether a difference between

3   the number of outstanding locks granted and the first value is less than a first

4   predetermined threshold.

1   28.   (Original)   A method as recited in Claim 25, further comprising, if it is

2   determined to increase the first value, then determining whether to decrease the value

3   based on a whether a difference between the number of outstanding locks granted and

4   the second value is greater than a second predetermined threshold.

1   29.   (Original)   A method as recited in Claim 28, wherein the particular amount is

2   based on the second predetermined threshold.

1   30.   (Original)   A method as recited in Claim 29, wherein the particular amount is no

2   greater than the second predetermined threshold.

1   31.   (Canceled)

Docket No.: 50325-0511

1   32.   (Currently Amended) A computer-readable medium carrying one or more sequences
2   of instructions for controlling a number of concurrent users of a distributed resource
3   on a network, the resource limited to a maximum number of concurrent users, which
4   instructions, when executed by one or more processors, cause the one or more
5   processors to carry out the steps of:
6   associating a user identification for each user with one host of a plurality of hosts on
7   which are executing a corresponding plurality of local lock manager processes
8   of a distributed lock manager process,
9   wherein each of the plurality of local lock manager processes may grant a lock on the
10   same resource <u>at any time when a number of outstanding locks granted on the</u>
11   <u>same resource is less than the specified maximum number of concurrent users;</u>
12   and
13   responding to a request for the resource associated with a first user having a first user
14   identification associated with a first host of the plurality of hosts by requesting
15   a lock from a first local lock manager executing on the first host.

1   33.   (Previously presented)   A computer-readable medium carrying one or more
2   sequences of instructions for controlling a number of concurrent users of a distributed
3   resource on a network, the resource limited to a maximum number of concurrent
4   users, which instructions, when executed by one or more processors, cause the one or
5   more processors to carry out the steps of:
6   receiving a request for the distributed resource from a client process for a user having
7   a user identification;
8   determining one home location associated with the user identification, the home
9   location indicating a unique host among a plurality of hosts executing a
10   corresponding plurality of local lock manager processes of a distributed lock
11   manager process,
12   wherein each of the plurality of local lock manager processes may grant a lock on the
13   same resource; and

Docket No.: 50325-0511

14   sending a request for a lock object for the distributed resource to a first local lock

15   manager process of the distributed lock manager process, the request

16   including the home location;

17   receiving the lock object for the distributed resource from a second local lock

18   manager process executing on the unique host, if a number of outstanding

19   locks granted by the second local lock manager process is less than a value of

20   a local resource maximum defined for the second local lock manager process;

21   and

22   providing access to the resource to the first client in response to receiving the lock

23   object.

1   34.   (Previously presented)   A computer-readable medium carrying one or more

2   sequences of instructions for controlling a number of concurrent users of a distributed

3   resource on a network, the distributed resource limited to a maximum number of

4   concurrent users which instructions, when executed by one or more processors, cause

5   the one or more processors to carry out the steps of:

6   receiving at a first local lock manager process of a distributed lock manager process a

7   request for a lock object for the distributed resource from a resource server,

8   the request including data indicating a particular user home location, and the

9   first local lock manager process executing on a first host;

10   determining whether a second local lock manager process of the distributed lock

11   manager process is associated with the particular user home location, the

12   second local lock manager process executing on a second host different from

13   the first host,

14   wherein the first local lock manager process may grant a lock on the same resource as

15   the second local lock manager process; and

16   if it is determined that the second local lock manager process is associated with the

17   particular home location, then requesting the lock object from the second local

18   lock manager process.

1   35.   (Previously presented)   A computer-readable medium carrying one or more

2   sequences of instructions for distributing a resource on a network, the resource

3   limited to a maximum number of concurrent users, which instructions, when executed

4   by one or more processors, cause the one or more processors to carry out the steps of:

5   generating a value for a local resource maximum number of users stored on each host

6   of a plurality of hosts executing a corresponding plurality of local lock

7   manager processes of a distributed lock manager process such that a

8   summation over the plurality of hosts of the value for the local resource

9   maximum yields an aggregate value that does not exceed the maximum

10   number of concurrent users,

11   wherein each of the plurality of local lock manager processes may grant a lock on the

12   same resource;

13   determining whether to increase a first value in a first resource maximum stored on a

14   first host of the plurality of hosts; and

15   if it is determined to increase the first resource maximum, then

16   decreasing by a particular amount a second value in a second resource

17   maximum stored on a second host of the plurality of hosts, and

18   increasing by the particular amount the first value in the first resource

19   maximum stored on the first host,

20   wherein each local lock manager process is configured to grant a lock for the resource

21   if the number of outstanding locks granted by the local lock manager process

22   is less than a value of the local resource maximum stored on the

23   corresponding host.

1   36.   (Canceled)

1   37.   (Currently Amended) An apparatus for controlling a number of concurrent users of a

2   distributed resource on a network, the resource limited to a maximum number of

3   concurrent users, comprising:

4   means for associating a user identification for each of the concurrent users with a

5   unique host; and

Docket No.: 50325-0511

6   means for responding to a request for the resource associated with a first user among

7   the concurrent users who has a first user identification associated with a first

8   host by requesting a lock from a local lock manager process executing on the

9   first host,

10   wherein the local lock manager process may grant a lock on the same resource as

11   another local lock manager process <u>at any time when a number of outstanding</u>

12   <u>locks granted on the same resource is less than the maximum number of</u>

13   <u>concurrent users.</u>

1   38.   (Previously presented)   An apparatus for controlling a number of concurrent

2   users of a distributed resource on a network, the resource limited to a maximum

3   number of concurrent users, comprising:

4   means for receiving a request for the distributed resource from a client process for a

5   user having a user identification;

6   means for determining one home location associated with the user identification, the

7   home location indicating a unique host among a plurality of hosts executing a

8   corresponding plurality of local lock manager processes of a distributed lock

9   manager process,

10   wherein each of the plurality of local lock manager processes may grant a lock on the

11   same resource;

12   means for sending a request for a lock object for the distributed resource to a first

13   local lock manager process of the distributed lock manager process, the

14   request including the home location;

15   means for receiving the lock object for the distributed resource from a second local

16   lock manager process executing on the unique host, if a number of

17   outstanding locks granted by the second local lock manager process is less

18   than a value of a local resource maximum defined for the second local lock

19   manager process; and

20   means for providing access to the resource to the first client in response to receiving

21   the lock object.

Docket No.: 50325-0511

1   39.   (Previously presented)   An apparatus for controlling a number of concurrent

2   users of a distributed resource on a network, the distributed resource limited to a

3   maximum number of concurrent users, comprising:

4   means for receiving at a first local lock manager process of a distributed lock

5   manager process a request for a lock object for the distributed resource from a

6   resource server, the request including data indicating a particular user home

7   location, and the first local lock manager process executing on a first host;

8   means for determining whether a second local lock manager of the distributed lock

9   manager is associated with the particular user home location, the second local

10   lock manager process executing on a second host different from the first host,

11   wherein the first local lock manager process may grant a lock on the same resource as

12   the second local lock manager process; and

13   means for requesting the lock object from the second local lock manager, if it is

14   determined that the second local lock manager is associated with the particular

15   home location.

1   40.   (Original)   An apparatus for distributing a resource on a network, the resource

2   limited to a maximum number of concurrent users, comprising:

3   means for generating a value for a local resource maximum number of users stored on

4   each host of a plurality of hosts in the network such that a summation over the

5   plurality of hosts of the value for the local resource maximum yields an

6   aggregate value that does not exceed the maximum number of concurrent

7   users;

8   means for determining whether to increase a first value in a first resource maximum

9   stored on a first host of the plurality of hosts; and

10   means for decreasing by a particular amount a second value in a second resource

11   maximum stored on a second host of the plurality of hosts, if it is determined

12   to increase the first resource maximum;

Docket No.: 50325-0511

13 means for increasing by the particular amount the first value in the first resource

14 maximum stored on the first host, if it is determined to increase the first

15 resource maximum;

16 means for granting a lock for the resource if the number of outstanding locks granted

17 by the local lock manager is less than a value of the local resource maximum

18 stored on the corresponding host.

1 41. (Canceled)

1 42. (Currently Amended) An apparatus for controlling use by concurrent users of a

2 distributed resource on a network, wherein use of the resource is limited to a specified

3 maximum number of concurrent users, comprising:

4 a host that is communicatively coupled to a network that contains the distributed

5 resource and that comprises one or more processors and a computer-readable

6 storage medium;

7 one or more sequences of instructions stored in the computer-readable storage

8 medium which, when executed by the one or more processors, cause the one

9 or more processors to carry out the steps of:

10 associating a user identification for each user with one host of the plurality of

11 hosts; and

12 responding to a request for the resource associated with a first user having a

13 first user identification associated with a first host of the plurality of

14 hosts by requesting a lock from a lock manager process executing on

15 the first host,

16 wherein the local lock manager process may grant a lock on the same resource

17 as another local lock manager process <u>at any time when a number of</u>

18 <u>outstanding locks granted on the same resource is less than the</u>

19 <u>specified maximum number of concurrent users</u>.

1 43. (Previously presented)   An apparatus controlling concurrent users of a

2 distributed resource on a network, wherein the resource is limited to a maximum

3 number of concurrent users, comprising:

Docket No.: 50325-0511

4   a host that is communicatively coupled to a network that contains the distributed

5   resource and that comprises one or more processors and a computer-readable

6   storage medium;

7   one or more sequences of instructions stored in the computer-readable storage

8   medium which, when executed by the one or more processors, cause the one

9   or more processors to carry out the steps of:

10   receiving a request for the distributed resource from a client process for a user

11   having a user identification;

12   determining a home location associated with the user identification, the home

13   location indicating a unique host among a plurality of hosts that

14   execute a corresponding plurality of local lock manager processes of a

15   distributed lock manager process,

16   wherein each of the plurality of local lock manager processes may grant a lock

17   on the same resource;

18   sending a request for a lock object for the distributed resource to a first local

19   lock manager process of the distributed lock manager process, the

20   request including the home location;

21   receiving the lock object for the distributed resource from a second local lock

22   manager process executing on the unique host, if a number of

23   outstanding locks granted by the second local lock manager process is

24   less than a value of a local resource maximum defined for the second

25   local lock manager process; and

26   providing access to the resource to the first client only in response to receiving

27   the lock object.

1   44.   (Original)   An apparatus controlling concurrent users of a distributed resource on

2   a network, wherein the resource is limited to a maximum number of concurrent users,

3   comprising:

4   a host that is communicatively coupled to a network that contains the distributed

5   resource and that comprises one or more processors and a computer-readable

6   storage medium;

14

Docket No.: 50325-0511

7   one or more sequences of instructions stored in the computer-readable storage

8   medium which, when executed by the one or more processors, cause the one

9   or more processors to carry out the steps of:

10   generating a value for a local resource maximum number of users stored on

11   each host of a plurality of hosts such that a summation over the

12   plurality of hosts of the value for the local resource maximum yields

13   an aggregate value that does not exceed the maximum number of

14   concurrent users;

15   determining whether to increase a first value in a first resource maximum

16   stored on a first host of the plurality of hosts; and

17   if it is determined to increase the first resource maximum, then

18   decreasing by a particular amount a second value in a second resource

19   maximum stored on a second host of the plurality of hosts, and

20   increasing by the particular amount the first value in the first resource

21   maximum stored on the first host,

22   granting a lock for the resource if the number of outstanding locks granted by

23   a lock manager process is less than a value of the local resource

24   maximum stored on the first host.

1   45.   (Previously presented)   An apparatus for controlling use by concurrent users of

2   a distributed resource on a network, wherein use of the resource is limited to a

3   specified maximum number of concurrent users, comprising:

4   a host that is communicatively coupled to a network that contains the distributed

5   resource and that comprises one or more processors and a computer-readable

6   storage medium;

7   one or more sequences of instructions stored in the computer-readable storage

8   medium which, when executed by the one or more processors, cause the one

9   or more processors to carry out the steps of:

10   receiving, at a first local lock manager process of a distributed lock manager

11   process, a request for a lock object for the distributed resource from a

12   resource server, wherein the request includes data indicating a

13   particular user home location;

14   determining whether a second local lock manager process of the distributed

15   lock manager process is associated with the particular user home

16   location, and if so, requesting the lock object from the second local

17   lock manager process,

18   wherein the first local lock manager process may grant a lock on the same

19   resource as the second local lock manager process.

1   46.   (Previously presented)   An apparatus as recited in Claim 45, wherein execution

2   of the one or more instructions by the one or more processors further causes:

3   when the second lock manager process is not associated with the particular home

4   location, determining whether a first number of outstanding locks granted by

5   the first local lock manager process for the distributed resource is less than a

6   first local maximum number of users no greater than the maximum number of

7   concurrent users, and if so, then incrementing the first number of outstanding

8   locks granted and providing the lock object to the resource server.

1   47.   (Previously presented)   An apparatus as recited in Claim 45, wherein each local

2   lock manager process of the distributed lock manager process stores a corresponding

3   local maximum number of users for the distributed resource in a lock data structure

4   associated with the local lock manager process, and an aggregate of local maximum

5   numbers in lock data structures associated with all lock manager processes in the

6   distributed lock manager process for the distributed resource is no greater than the

7   maximum number of concurrent users to which the distributed resource is limited.

1   48.   (Previously presented)   An apparatus as recited in Claim 45, wherein execution

2   of the one or more instructions by the one or more processors further causes:

3   receiving a request for a lock object from a third local lock manager process of the

4   distributed lock manager process in response to a request from a second

5   resource server;

Docket No.: 50325-0511

6   determining whether a first number of outstanding locks granted by the first lock

7   manager process for the distributed resource is less than a first local maximum

8   number of users no greater than the maximum number of concurrent users;

9   and

10   if it is determined the first number of outstanding locks granted is less than the first

11   local maximum number, then

12   incrementing the first number of outstanding locks granted, and

13   providing the lock object for the second resource server.

1   49.   (Previously presented)   An apparatus as recited in Claim 45, wherein execution

2   of the one or more instructions by the one or more processors further causes:

3   providing the lock object to the resource server in response to receiving the lock

4   object from the second lock manager process.

Docket No.: 50325-0511